

A Guide to  
**Trails of**  
**GUÁNICA**



State Forest and Biosphere Reserve

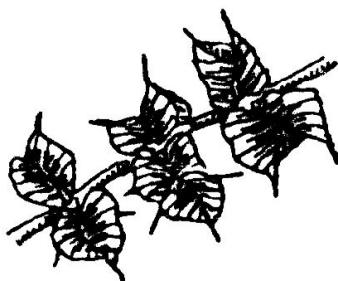
# WELCOME!

Welcome to the Guánica State Forest, a United Nations Biosphere Reserve. This guide will introduce you to the many trails that traverse this beautiful forest, and to the diverse communities of plants and animals here. We encourage you to explore the trails described in this booklet, to learn about the common species of plants, and to watch for birds, lizards and other animals that live here--many of which are found nowhere else in the world.

**In the center of the guide (pages 15 and 16), is a map of the Guánica forest and its trails. Please refer to the map in orienting yourself.**

Before hiking these trails, please be sure you are well prepared. Though the trails vary in difficulty and terrain, it is always best to wear good athletic shoes or hiking boots for comfort and support. A hat or sunscreen provides protection against the very hot sun. Bring plenty of drinking water, as there are no constant sources of fresh water in the forest.

Please avoid the poisonous chicharrón (*Comocladia dodonea*), a shrub with reddish spiny leaves; it irritates the skin on contact.



*Comocladia dodonea*

Please take only photos, leave only footprints. Collecting plants or animals in the forest is prohibited.

**Enjoy your visit!**

## INTRODUCTION TO THE TRAILS

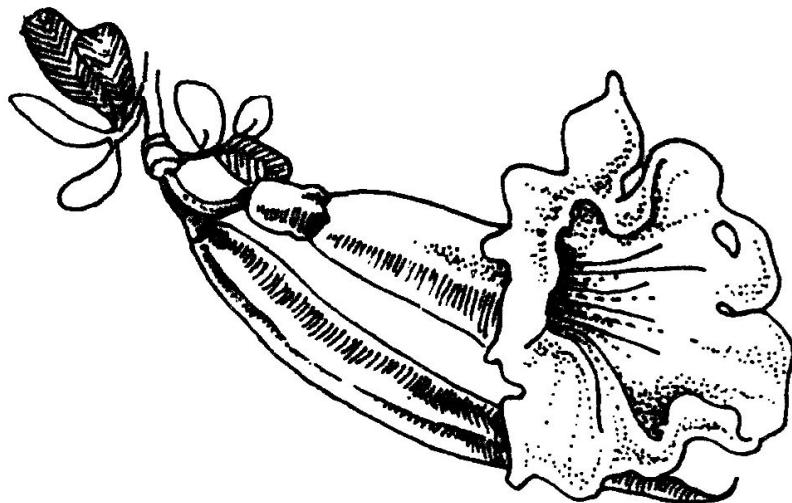
The Guánica forest encompasses over 4000 hectares (1620 acres) and 57 km (36 miles) of trails and old roads. This first section of the guide discusses 12 major trails in the eastern portion of the forest, with information on the location, challenge level and length of each trail. Also included are the major natural features to look for on each trail.

### BALLENA

**Location:** From forest headquarters south to Route 333 near Punta Ballena.

**Length and challenge:** 2 km, easy, partially paved old road.

**Highlights:** This trail passes through mahogany plantation and deciduous forest just south of the forest office, to dry limestone scrub with cactus, agave and twisted gumbo limbo trees near Route 333. At 1 km a sign for *Guayacán Centenario* directs you on a small side trail into a ravine with an extraordinary, 700-year-old Guayacán tree whose girth exceeds 2 meters (6 feet). In contrast to the stunted cactus forest of the hot dry limestone hills just outside the ravine, the cool, moist canyon supports diverse trees that keep their leaves all year.



### COBANAS

**Location:** Off Route 334/Maniel Road, 2 km northwest of forest headquarters.

**Length and challenge:** 3.5 km to state forest boundary, moderate, old road of variable quality.

**Highlights:** This old road follows a ridge east through second-growth deciduous forest. At 3 km it enters an abandoned plantation of campeche trees, once an important source of black dye for textiles, and medicine for dysentery.

## CUEVA

**Location:** From the parking lot at the end of Route 333 to the Llúberas road.

**Length and challenge:** 1.5 km, easy, mostly flat, wide dirt trail.

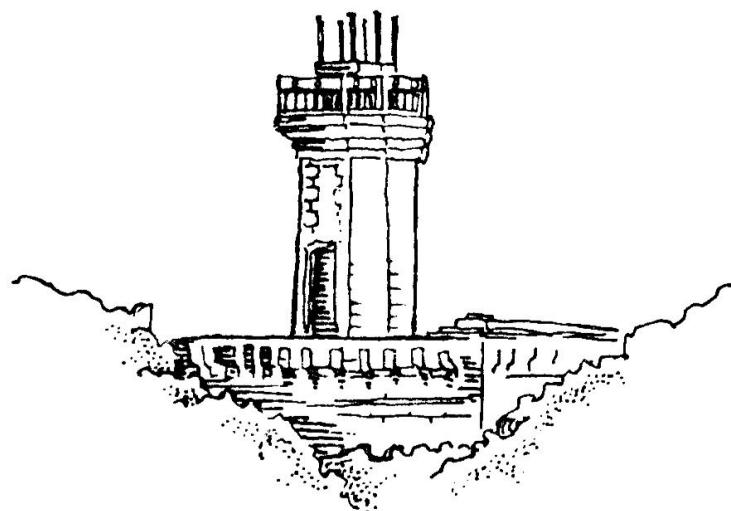
**Highlights:** The Cueva trail traverses north through a coastal forest of young trees, agave and 3-meter tall prickly-pear cacti. Listen for the shrill "troo-pial" calls of the orange and black troupial, a bird that frequents this dry forest. Brilliant butterflies are also particularly common along this trail. The trail passes near a large cave that is home to two species of bats, a very unusual collection of *Cecropia* trees found nowhere else on the south coast, and a type of eyeless shrimp known only here. *Because of its fragility and biological significance, you should obtain prior permission from the forest office and be accompanied by a guide to visit the cave.*

## \* FUERTE

**Location:** From the forest headquarters to Route 333 at Playa Jaboncillo.

**Length and challenge:** 5.5 km, moderate, hilly in places, variable quality road.

**Highlights:** This road follows a ridgeline and affords beautiful views of the forest, Guánica town and the Caribbean sea. Fuerte leads to a fort that was once the site of an observatory for the Spanish Armada. The original fort was destroyed during the American invasion of Guánica in 1898, but during the 1930's the Civilian Conservation Corps rebuilt a look-out tower on the ruins. Several small side trails--the Hoya Honda, the Picua and the El Ver--descend steeply off the Fuerte road to the south, passing into lush ravines supporting evergreen vegetation and old plantations. The Hoya Honda trail leads to a shady grove of mahogany and thrinax palm in a pleasant valley cut by dry streambeds.



## GRANADOS

**Location:** Just 0.25 km north of the forest Headquarters, along Route 334, east to the Llúberas Road (a nice loop returns you to the parking lot via the Llúberas road).

**Length and challenge:** 1 km, easy, slightly hilly at the beginning.

**Highlights:** The Granados is an especially good trail for bird-watching; forty species of migratory and resident birds have been banded here during a 17-year ornithology project. It is surrounded by a tall deciduous forest of hoja menuda, mesquite, guayacán and violet trees. Some of the trees are being parasitized by mistletoe. Many of the rocks and cobbles in the trail contain well-preserved coral fossils.

## GUTIERREZ

**Location:** About 0.5 km northwest of the forest Headquarters along Route 334; proceeds northeast to connect with the Cobanas trail.

**Length and challenge:** 1 km, easy.

**Highlights:** Walking the Gutierrez, you have the opportunity to view a forest in recovery. In the 1950's, this area supported plantations of campeche, mesquite, zarcilla, as well as cow pasture. After forty years of protection, native forest is slowly regenerating here.

## LA HOYA

**Location:** Begins at 0.1 km along the Cobanas trail

**Length and challenge:** 2.5 km, moderate, occasionally hilly, variable trail.

**Highlights:** The Hoya trail begins at the entrance to a narrow, lush ravine populated by vine-covered cocoloba saplings, large ucar trees, and agave. It winds through thickets of evergreen forest that flourish in patches where spring waters surface from the limestone bedrock. One such spring, the "water hole," actually has a group of introduced guppies in it! The evergreen oases alternate with thickets of dry deciduous forest. Many yellow and black, purple and brown butterflies weave among the trees.

## LLÚBERAS

**Location:** Begins at the headquarters parking lot, at picnic area, continuing to eastern boundary of forest.

**Length and challenge:** 8 km, moderate, old road.

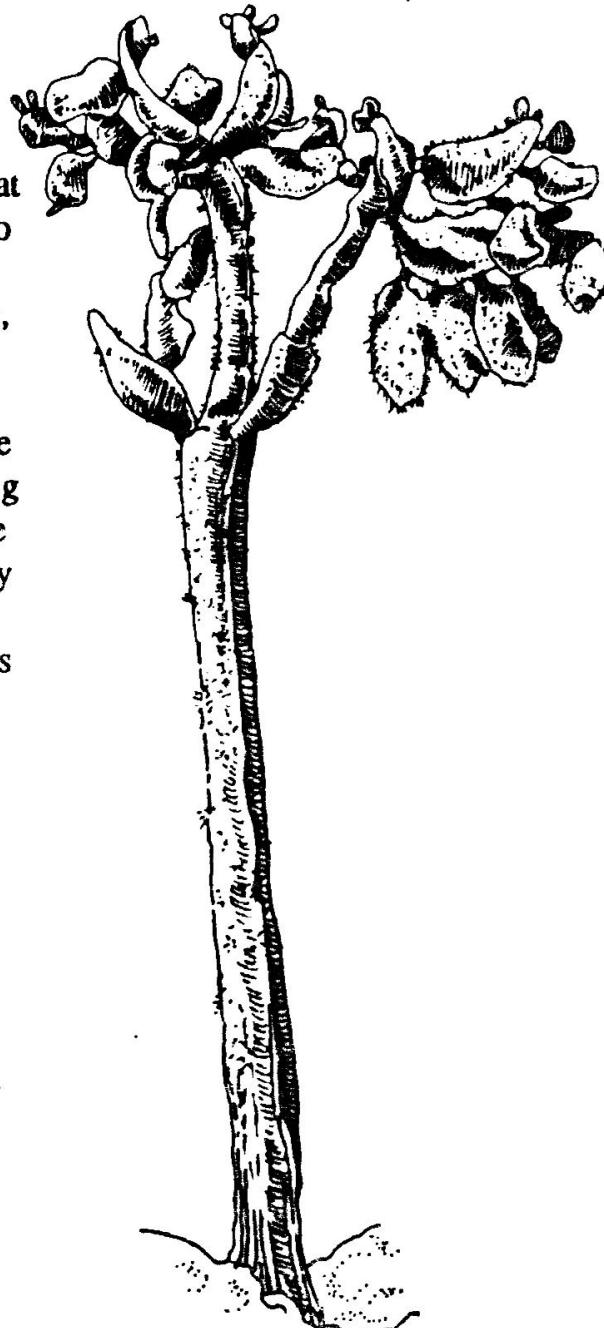
**Highlights:** One of the longest trails in the forest, the Llúberas travels through all the major vegetation associations of this reserve: deciduous and evergreen forest, matorral and limestone scrub. Near the eastern boundary of the forest are the ruins of the Llúberas sugar mill and cane plantation that once prospered here. The Cueva and Guitarra trails, which deliver you to the beach, branch south off the Llúberas.

## MESETA

**Location:** Begins at the parking lot at the end of Route 333 and continues to the eastern boundary of the forest.

**Length and challenge:** 3.5 km, easy, flat.

**Highlights:** This trail follows the rugged coast of the Guánica forest, the sandy coves and rocky headlands along the Caribbean shore. Here is a chance to explore the vegetation of coastal dry forest: the sebucán and prickly-pear cactus scrub, and the purple milkweeds and sea-grape shrubs with large fleshy leaves dotting the beach berms. The bedrock cliffs overlooking the sea are carpeted with dwarf white mangroves, button-wood, and cedar, pruned by constant wind and salt spray. Though they are only a meter high, these hunched "bonsai" trees may be a century old. Watch for sea birds here: magnificent frigatebirds with a 2-meter wingspan, graceful white tropicbirds, and brown pelicans diving for fish.



Prickly pear cactus  
*Opuntia moniliformis*

## MURCIÉLAGO

**Location:** Just 0.2 km to the east of the forest headquarters, beyond the picnic area.

**Length and challenge:** 1.2 km, moderate, hilly terrain in places.

**Highlights:** The dead-end Murciélagos trail drops south from the Llúberas Road toward Route 333, taking you through mahogany plantation (whose spindly trees are almost 40 years old!) and dry deciduous forest, eventually descending into a moist ravine. The Murciélagos cuts through chalky limestone bedrock, where Puerto Rican toadies nest. Listen for the sharp "mceep" of this small green bird in the trees along the trail. Just beyond the start of the trail, the **Dinamita** trail veers off to the left; although difficult to trace in places, the beautiful **Dinamita** can be hiked all the way to Route 333.

## OJO DE AGUA

**Location:** Off the Fuerte trail, 1.2 km west of the forest headquarters, proceeding north to join Route 334, the Maniel road.

**Length and challenge:** 1.5 km, moderate, hilly terrain, variable road.

**Highlights:** As its name suggests, the Ojo de Agua enters a verdant forest fed by springs, in sharp contrast to the open deciduous forest of mahogany along the Fuerte trail. *Amyris* trees, whose crushed leaves and bark smell richly of citrus, are common in the evergreen thicket. Tiny blue damselflies patrol the path, and lizards warm themselves in sunflecks on the forest floor.

## VELEZ/VIGIA

**Location:** Begins 1 km northeast of the forest headquarters, from the Llúberas road. Return via the Granados trail for a nice loop.

**Length and challenge:** 1 km to the eastern border of the forest, easy.

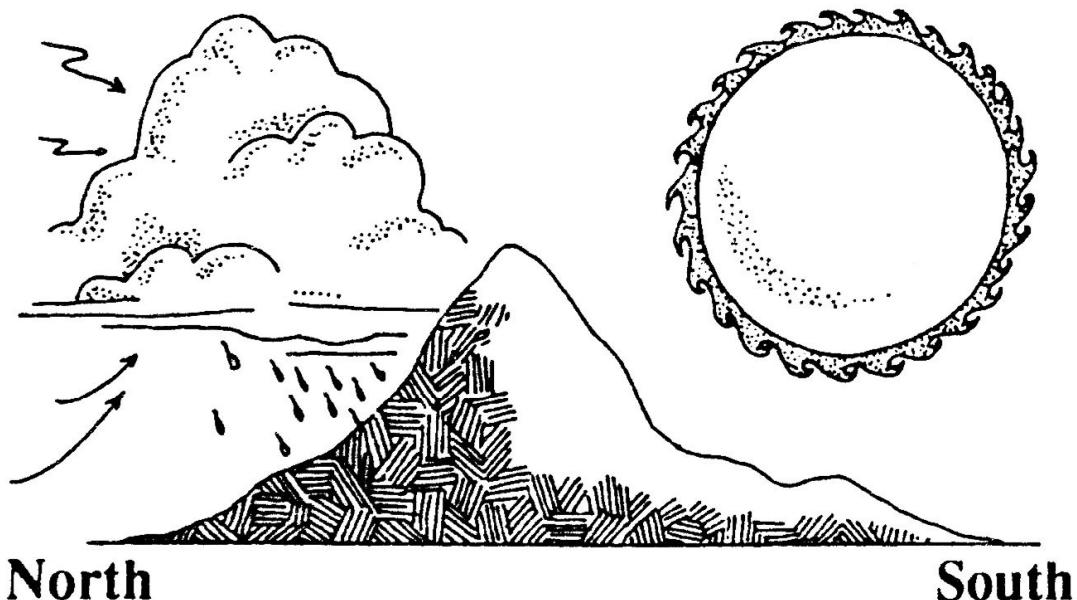
**Highlights:** This short, tree-shaded trail takes you to the highest hill in the forest, Criollo II, where there is a spectacular overlook at the edge of a cliff (careful!). From here you can view the northern sector of the forest, the Río Loco valley, Yauco, and the Cordillera Central. The Vigia (from the Spanish word for the crow's nest of a ship) affords you a vista of the many different types of forest within the Guánica Biosphere Reserve. Often, enormous turkey vultures soar on the air thermals rising from the valley.

## \* WHY SO DRY?

The subtropical dry forest of Guánica is a world apart from the wet forests covering the high mountains and the north coast of Puerto Rico. Why is the landscape here so different?

The 1500 meter (5000 ft) high mountains of the Cordillera Central, built of volcanic basalts 200 million years old, are the backbone of the island. Extremely steep (most with grades over 50%), these mountains block rain clouds coursing in on the tropical trade winds blowing from the northeast. Although you may hear thunderstorms forming over the Cordillera, be assured that most of that rain will evaporate before ever reaching the south coast. The mountain forests may be deluged by up to 5 meters (15 feet) of rain each year, while Guánica receives a meager 90 cm (35 inches).

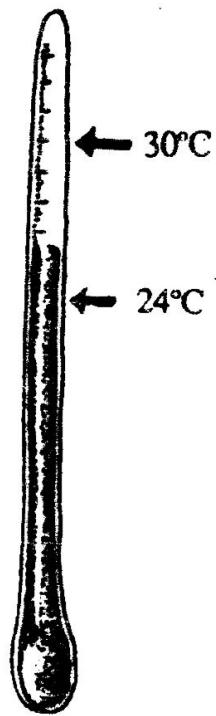
Rain falls unevenly throughout the year, and the forest changes dramatically with the seasons. From December to April, the driest months, almost half of the trees drop their leaves, only to flower and leaf out exuberantly in the wetter season from August to November. Once or twice a year, on average, torrential rains flood the dry streambeds, leaving water scars high up on ravine walls, and transporting soil, rocks, seeds and nutrients throughout the thirsty forest.



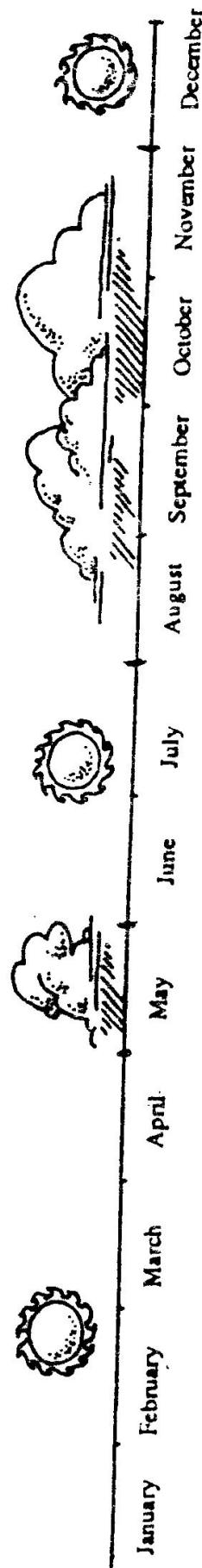
The Cordilleran rain shadow

Even when fleeting showers do fall in Guánica, the valuable water is rapidly lost to the hot tropical sun. The remaining rain water also percolates readily through the thin soil and porous limestone bedrock of the forest floor, often flowing into underground streams. Notice that the limestone here is riddled with holes, created by water puddling and dissolving the soft rock. Cycles of wetting and drying bake the bedrock surface into a briule swiss-cheese ceramic. Over thousands of years, some of these holes gradually enlarge to form caves and sinkholes.

The drainage patterns of the forest create a patchwork of habitats that support a variety of animals and over 700 species of plants. For example, cooler, shady caves and ravines hold moisture longer than the sunny exposed hillsides, and foster the growth of plants that cannot survive in drier areas. Other plants like cacti, adapted for long periods of drought, thrive in the dry coastal flats. You are unlikely to see rain, streams or ponds here; yet water is the force that shapes this diverse forest.



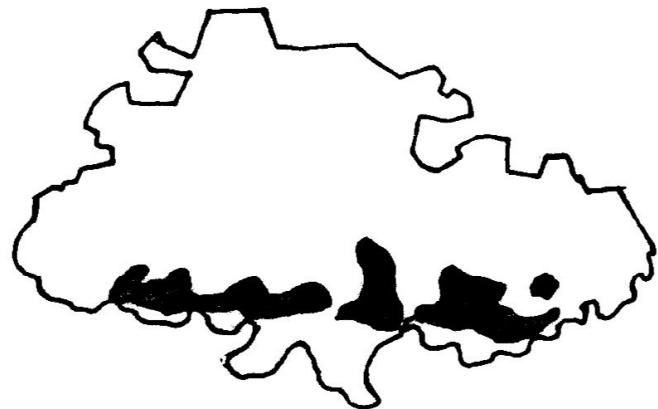
Temperatures fluctuate only slightly throughout the year at Guánica, averaging about 25°C (79°F) over the day and night. However, the temperatures here vary greatly from place to place. Walk out of the hot sun into the shade, and you will feel the noticeable drop in temperature. Exposed hillsides can heat up to 30°C (100°F) in direct sun, while shady ravines may be as much as 5°C (10°F) cooler. Plants and animals respond to these variations. Lizards and snakes, for example, regulate their own body temperatures by moving among sun flecks and shade on the forest floor.



## \* THE DRY SCRUB FOREST

This community of stunted, twisted trees and cacti occupies the driest part of the forest. Sparse, sandy red soil thinly covers the rough limestone bedrock. Many plants root directly in the water-carved holes that capture small amounts of rain and soil.

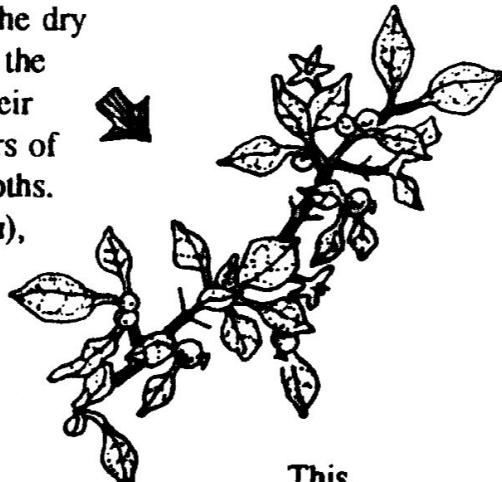
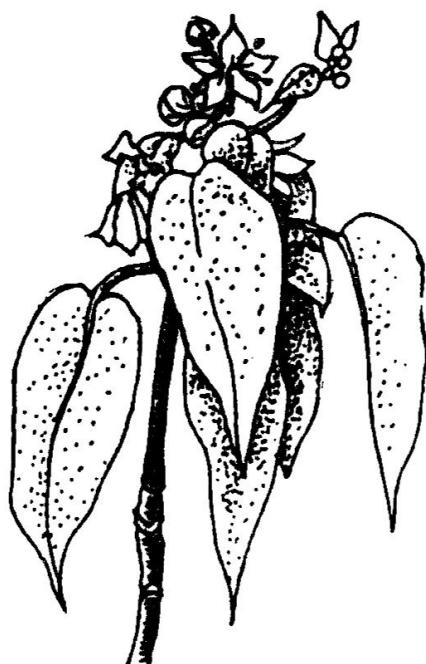
Plants here display many methods of coping with heat and drought. The small, fleshy leaves of many shrubs and trees minimize water loss during photosynthesis.



■ Where to find dry scrub forest  
in the Guánica reserve.



Many of the shrubs inhabiting the dry scrub are members of the coffee family, the Rubiaceae. They are recognizable by their small opposite leaves, thorns, and clusters of tiny white tubular flowers that attract moths. Pictured here is **tintillo** (*Randia aculeata*), which has edible blue-black berries.



This "humble" croton shrub (*Croton humilis*) has brown-green, highly fragrant leaves that droop during dry periods to avoid direct sunlight. Aromatic shrubs in the genus *Croton* are common throughout Guánica.

Trees such as the ucar and the gumbo-limbo shed their leaves during the dry season, and grow slower than their counterparts in moister parts of the forest.

The widespread ucar tree (*Bucida buceras*) has whorled leaves with paired spines at the base, groups of white flowers at the ends of twigs, and yellow-brown bark. Though they are stunted and creeping here, ucars attain impressive dimensions in other parts of the Guánica forest. They have been cut extensively for fenceposts in Puerto Rico, depriving the endangered yellow-shouldered blackbird (*Agelaius xanthomus*) of nest sites.



The unmistakable **gumbo-limbo** tree (*Bursera simaruba*), has a stout trunk, peeling red bark and compound leaves on reddish twigs. It produces a latex that has been used as medicine, glue and incense. The saplings are also used as living fences.

The large fragrant white flowers of the gracefully contorted tree illustrated on the right occur among the clusters of long, thin leaves at the ends of branches. This is the **aleli** (*Plumeria alba*). Unlike ucar and gumbo-limbo, these trees do not drop their leaves voluntarily, but are frequently defoliated by brilliant yellow and black caterpillars.

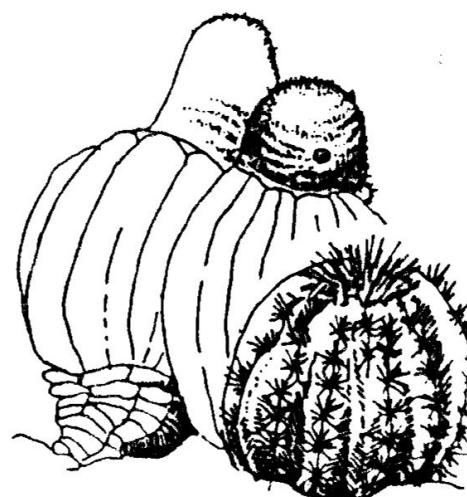


Cacti have converted their leaves into spines; their green, succulent stems produce food for the plant and store water. Many plants, such as the **melon cactus**, have spreading shallow root systems that capture water over a large area.

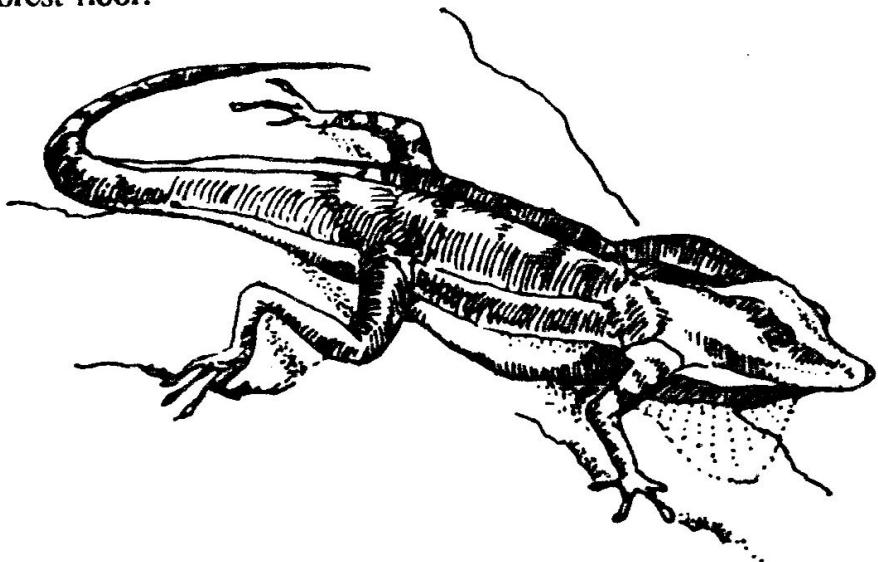


The brilliant pink flowers of the squat little **melon cactus** (*Melocactus intortus*) are pollinated by hummingbirds. Bullfinches eat the pink fruits and disperse the seeds throughout the scrub forest.

The Spanish dildo cactus (*Cephalocereus rostenii*) is a boon to animals of the dry forest. Puerto Rico bullfinches and troupials store food in the hollow older stems protected by spines, its large nectar-rich flowers are visited by bats, and its sweet, purple fruits with tiny black seeds are edible.

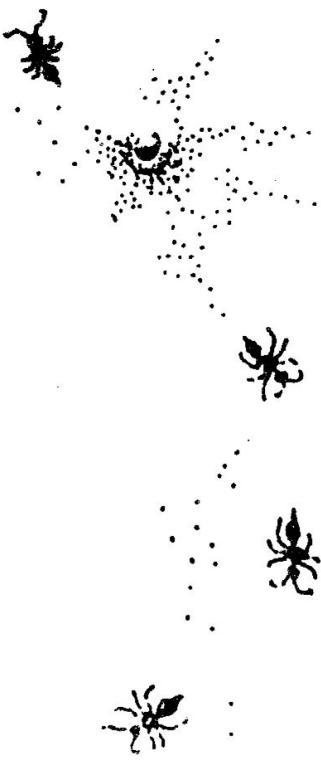


Birds and animals are especially easy to spot in this open sunny forest. Listen for lizards and anoles that skitter among the dry leaves on the forest floor.



If you sit quietly, geckos like the one shown above will approach you and occasionally fan out their dewlaps in a show of territoriality. Sometimes anolis lizards will sidle up to you to snatch mosquitoes that had meant to make a meal of you.

Watch for a brilliant blue flash and the sudden jerking motion of the rare *Ameiva wetmorei*, a shy lizard that hides among the rocks at your feet. The Ameiva has a black body with white spots and two narrow racing stripes down its back, and a long iridescent tail that must be seen to be believed.



The insects of this scrub forest are not just "lizard food," they are fascinating to study. The trains of ants scrambling over the ground collect and move seeds all over the forest, influencing the distribution of plants. In constructing their nests, ants turn over and replenish soil. Ants also break down fallen leaves, flowers, dead insects and other debris, and some even cultivate fungus gardens in their nests. Some ants nurse aphids on the leaves of plants in order to farm honeydew from them; others are important predators of insect pests. The Guánica forest boasts the highest diversity of ants and other insects on the entire island. The so-called "crazy ants" (*Paratrechina longicornis*) are especially common on the trail. Pause awhile to watch their busy, erratic style that earned them their name.

Dry forests throughout the world contain many plant species of high economic value. Parts of the Guánica forest have been used as plantations of native and exotic trees for hundreds of years. Some introduced trees, such as zarcilla, have thrived because they are tolerant of a variety of living conditions. Others, such as mahogany, have not grown well in this challenging environment. Over the past fifty years, the native trees have begun to regenerate among the guests.

V

The wood of the rare Guayacán tree (*Guaiacum officinale*) is among the most dense in the world. In fact, it is so heavy, it sinks in water. The Guayacán has been logged heavily for its lumber, once used for masts and prows by the Spanish Armada and their rivals, the Dutch navy. In the 1700's the valuable wood was often exchangeable with currency. An extract of the wood called guayacol was also employed as a remedy for cholera. Guayacán trees grow extremely slowly and thus may not reach a marketable size for centuries. The guayacán is easy to identify by its compound dark green leaves, its mottled peeling bark, its beautiful masses of blue flowers and its winged seed capsules.

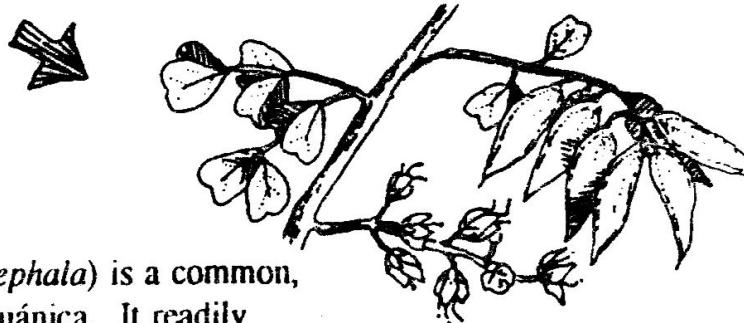


Introduced into Puerto Rico over 200 years ago, Dominican mahogany (*Swietenia mahogani*) is prized for furniture and fine carpentry. Many acres of mahogany were planted in Guánica during the 1930's, but the growth of the saplings here is severely impaired by the dry climate. Mahogany trees have compound leaves. The leaflets are drooping and long-pointed, and asymmetrical around the midvein. New leaves are often reddish. The unusual brown fruits are egg-shaped, large and hard, splitting open to release hundreds of winged seeds.

V



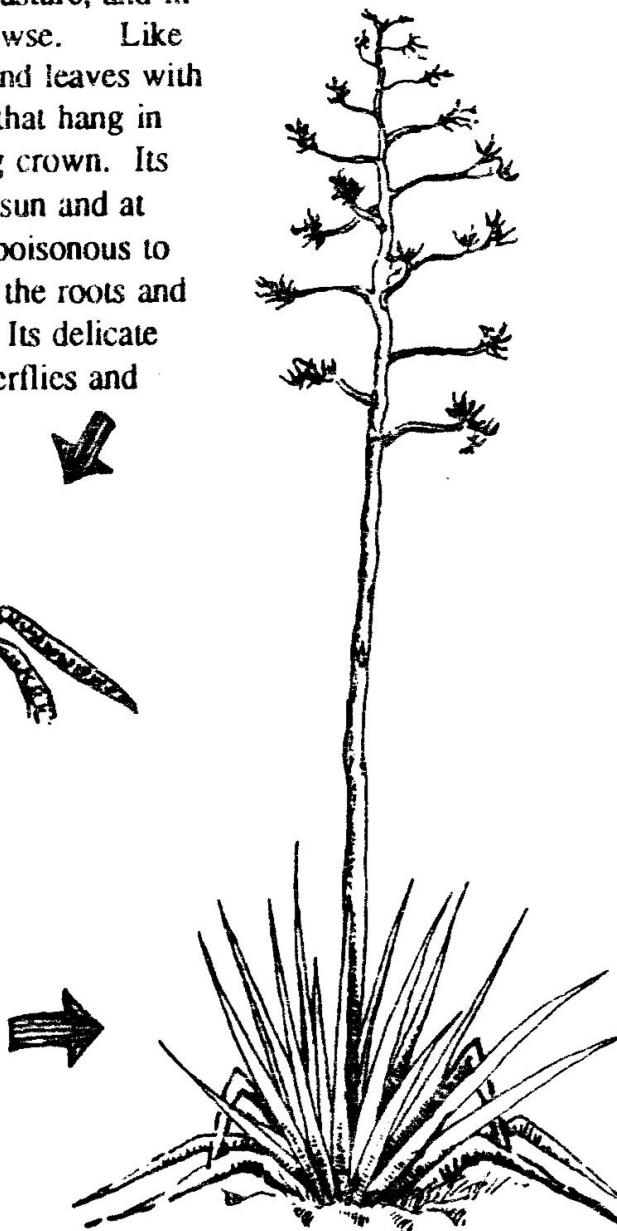
) Campeche trees (*Haematoxylum campechianum*) yield a red to black dye that was exported to Europe for hundreds of years from Puerto Rico. The active ingredient of this dye, haematoxylin, is a useful medicine for dysentery. Campeche has declined in economic importance in the last century, but trees are still grown ornamentals and for fenceposts. Campeche trees have deciduous, compound leaves with small heart-shaped leaflets. Its fissured, gray trunk often flutes at the base. Its flowers are showy, fragrant and yellow, and produce flat oblong pods.



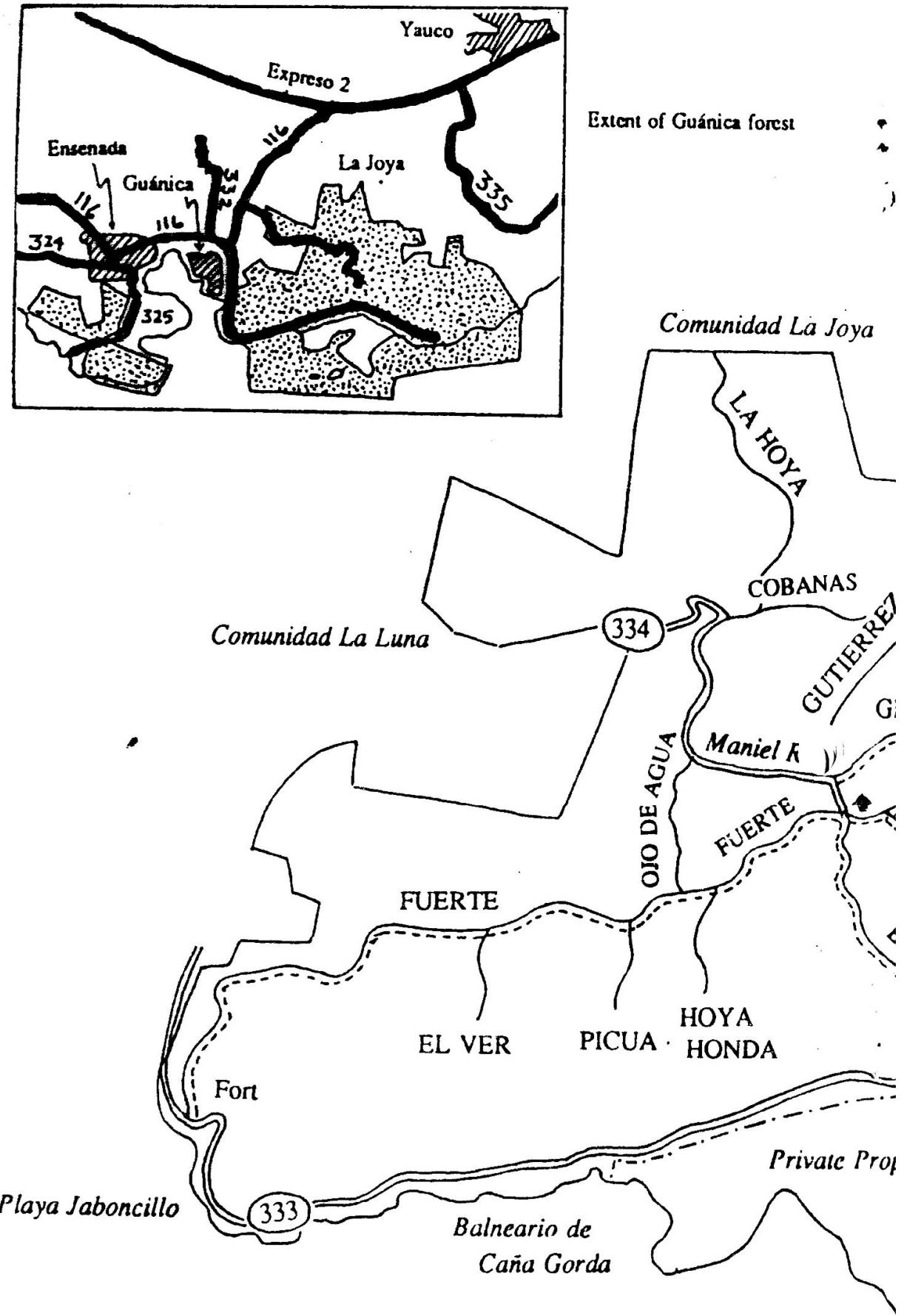
) Zarcilla (*Leucaena leucocephala*) is a common, "weedy" tree throughout Guánica. It readily colonizes disturbed areas like old pasture, and in places has been planted as cow browse. Like other legumes, zarcilla has compound leaves with tiny leaflets and long, brown pods that hang in clusters from its feathery, spreading crown. Its leaflets fold up in the hot noonday sun and at night. Young leaves and seeds are poisonous to horses, but not other livestock, and the roots and bark have been used for medicine. Its delicate white globes of flowers attract butterflies and honeybees.



) Several species of Century plant (*Agave*) have been planted in Guánica. So named because it can live up to 100 years, the century plant produces enormous basal leaves whose fibers (sisal) are used to make rope. Indigenous people have been weaving with sisal for 9,000 years. The plant sends up a single flower spike up to 10 meters tall and then dies.



# MAP OF THE GUÁNICA



# FOREST TRAILS

## Legend

paved road —————

secondary road - - - - -

trail —————

Headquarters ↑

kilometers

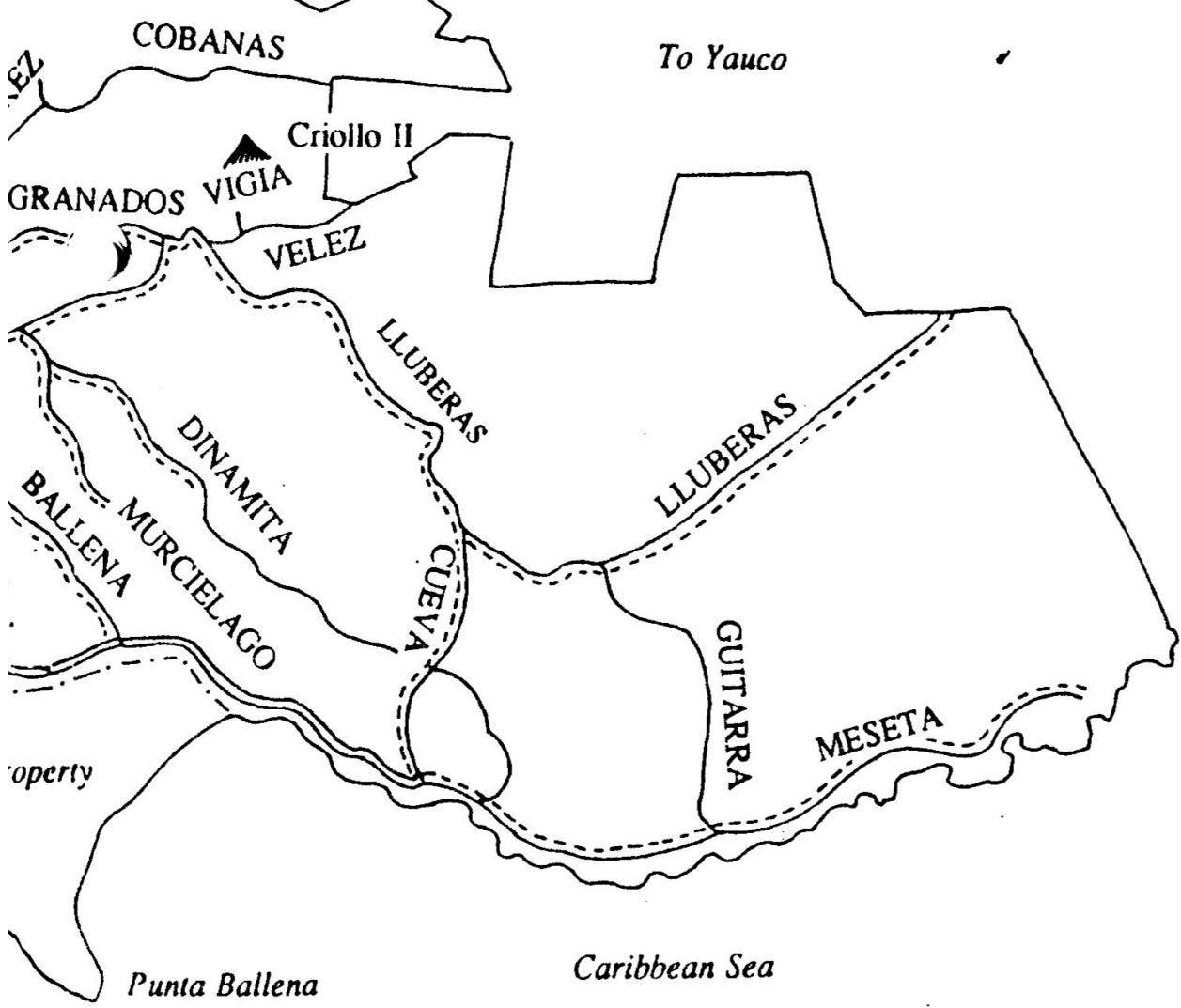
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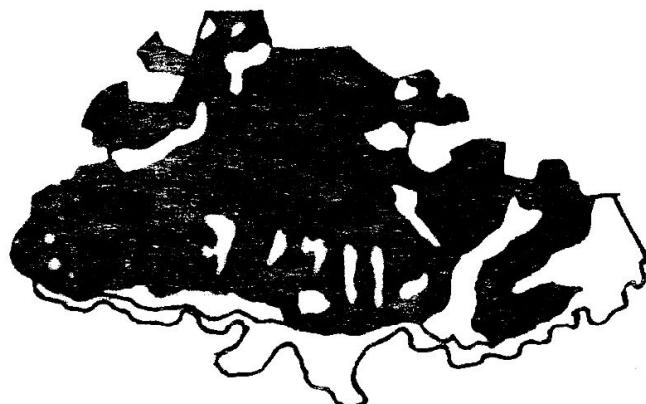


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## THE DECIDUOUS FOREST

The deciduous forest makes up almost two-thirds of the Guánica reserve. During the dry season, 40% of the trees in the deciduous forest shed their leaves, and the landscape changes dramatically. The fallen leaves release nutrients into the soil that the trees use during the next growing season. Sunlight floods the forest floor through the open canopy, affecting the activity of animals. Many trees flower and fruit toward the end of the dry season, creating a food bonanza for birds.



■ Where to find deciduous forest  
in the Guánica reserve.



Many of the trees in the Guánica deciduous forest are young and leggy. Some trees that were cut at the base to make fenceposts have sent up sprouts from the stump, forming a dense coppice of new stems.



### The Corecho bobo

(*Pisonia albida*) tree has leathery dark green leaves with a yellow midvein. Its gray trunk can grow very wide, sometimes splaying out in folds at the base, like an elephant's foot. Its soft, light wood has been used for fishing floats. You may find clusters of its very tenacious black seeds on your shoes after your walk today.



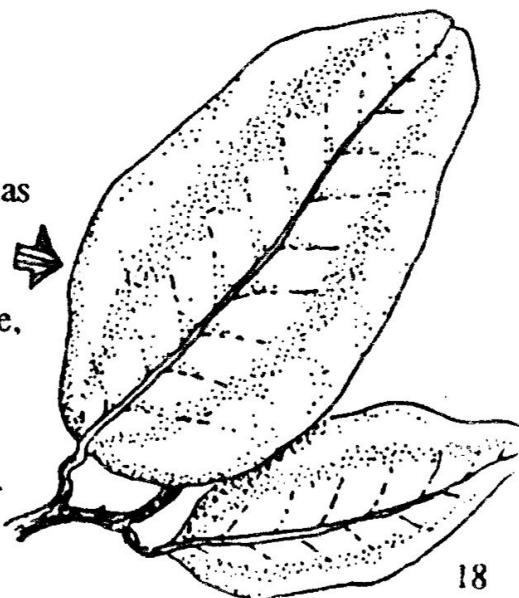
### Albarillo (*Exostema caribaeum*)

is a small tree with elliptic leaves that often roll up like cigarettes in the heat of the day. The leaves are clustered at the ends of scruffy twigs with characteristic bristles. The trees sport large yellow flowers. The bitter, dark gray bark has been used as a substitute for quinine in treating fevers.



### The mabi tree

(*Colubrina reclinata*) has dark orange, fissured bark that is fermented to make a delicious drink. The oval leaves are smooth and green on top, hairy on the underside, and remain on the tree all year.



### Indio (*Erythroxylum aureolatum*)

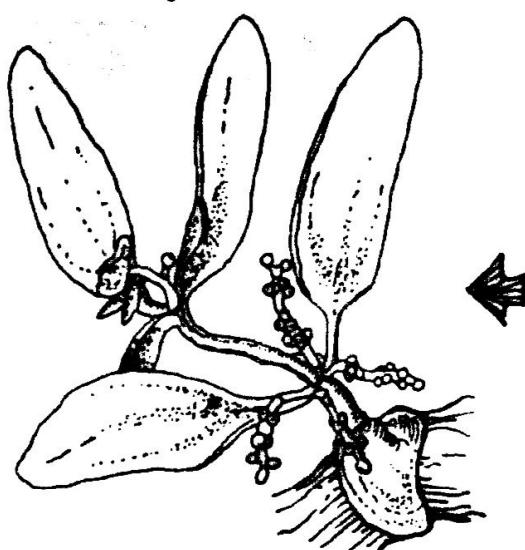
This distant relative of the coca tree has thin, light-green leaves with two faint parallel lines on either side of the midrib. Just before leafing out in June, Indio produces masses of small white flowers that are wonderfully fragrant. Taino Indians used to chew on an extracted paste of the leaves to muster courage before battle.

Vines snake along thin vertical tree trunks, and many trees are festooned with epiphytes, plants that live on other plants. Here are some common hitchhikers on trees.

**Spanish moss (*Tillandsia* spp.)** and **bromeliads** cling to the tree branches around you. It's hard enough to get water with your roots in the ground, and these epiphytes are suspended in the treetops. How do they live? Some tank-shaped bromeliads trap rainwater. Insects and centipedes often find a moist, cool home inside bromeliads. Spanish moss can live for months without water, but its absorbent mat soaks up rain when it comes.

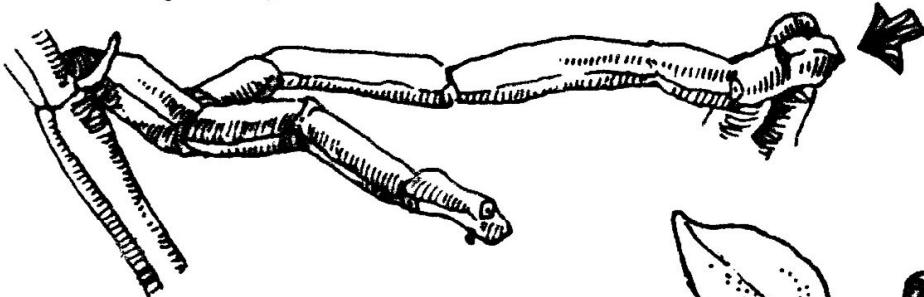


tillandsia

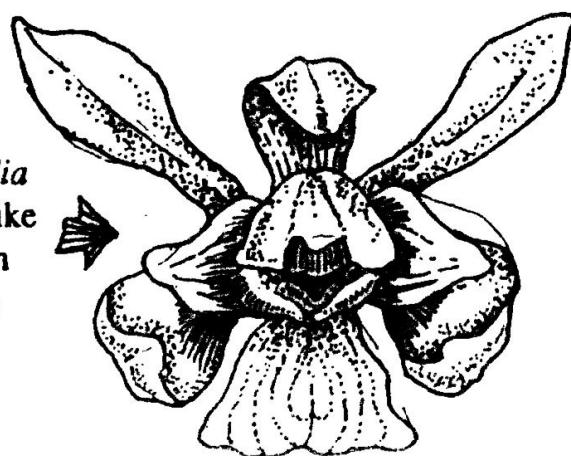


**Mistletoe**, a parasitic plant with rubbery leaves and stem, derives its nutrition directly from the tree itself. Look for it growing right out of tree branches. Its seeds are dispersed by the Euphonia bird.

This yellow leafless dodder vine (*Cuscuta americana*) twines up and roots in trees, usurping nutrients and eventually strangling the tree. It has reportedly been used as a love charm in the Antilles islands!



Several species of orchids are found high in trees. This orchid, *Encyclia krugii*, sends out a meter-long flower spike that bobs in the wind, resembles a bee in flight, and draws love-sick pollinators to the flowers. Many orchids throughout Puerto Rico are taken by collectors and their numbers in the wild are declining.

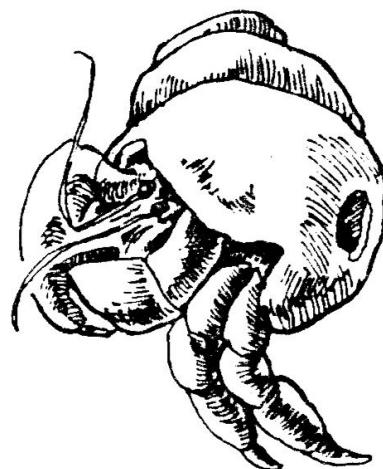




Looking up into some of the larger trees, you may notice the impressive brown nests of **termites** and their covered trails along the branches, like arteries leading off from the heart. The termites do not eat living wood; rather, they break down dead snags and fallen logs, returning nutrients to the soil. Termites are essential players in the cycles of life and death in the forest.

Among all the termite and human trails, you may see a shell moving by itself! Carefully pick up the shell and you will find an unexpected tenant inside: a **hermit crab** (*Coenobita spp.*). Other large land crabs like *Gecarcinus* prowl the uplands, too, excavating holes up to 6 inches across in the forest floor.

The deciduous forest is a particularly good place to spot birds, especially when many leaves are gone. The tiny green Puerto Rican tody (*Todus mexicanus*), with a downy white breast and a proud red throat patch, often flits out to branches along the trail to inspect passersby.



Another special resident is the endemic **Lizard Cuckoo** (*Saurothera merlini*), at nearly 3/4 m (2 ft) long the largest Caribbean cuckoo. It moves noiselessly among the trees and its tawny brown body blends with the forest, but you can sometimes glimpse its expressive black and white tail. Occasionally it issues a guttural laugh.

## EVERGREEN FOREST

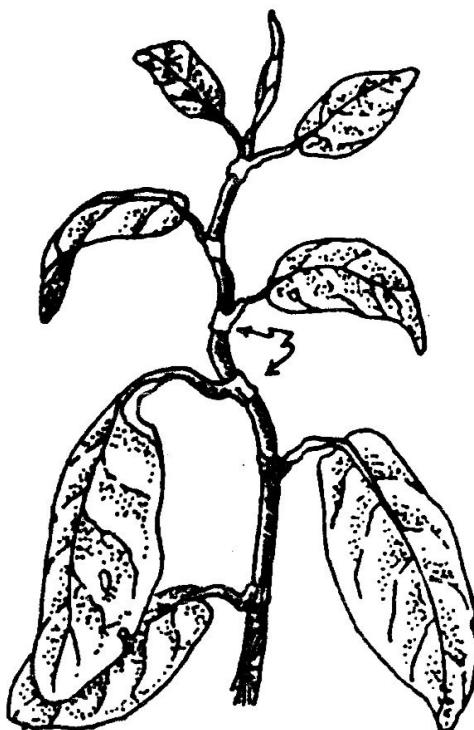
Where to find evergreen forest in the Guánica reserve.

The semi-evergreen forest covers about a fifth of the Guánica reserve and is generally restricted to moist ravines, valleys and sinkholes. Many of the steeper ravines of Guánica are remnants of ancient caves whose ceilings collapsed. Subterranean water that carved out the cave tunnels now flows as surface streams during heavy rainstorms. Springs also release groundwater to the surface, and many old wells dug by farmers in the early 1900's still remain. Soils in the ravines are thick, brown and well-developed, fed by abundant leaf litter and replenished by nutrient-rich flood waters.

This bounty of moisture creates a haven for many plants that are far more common in the high wet mountains of Puerto Rico. This forest contains the highest diversity of tree species in Guánica, most of which retain their leaves year-round. Leaves tend to be much larger, too, shading the forest floor.

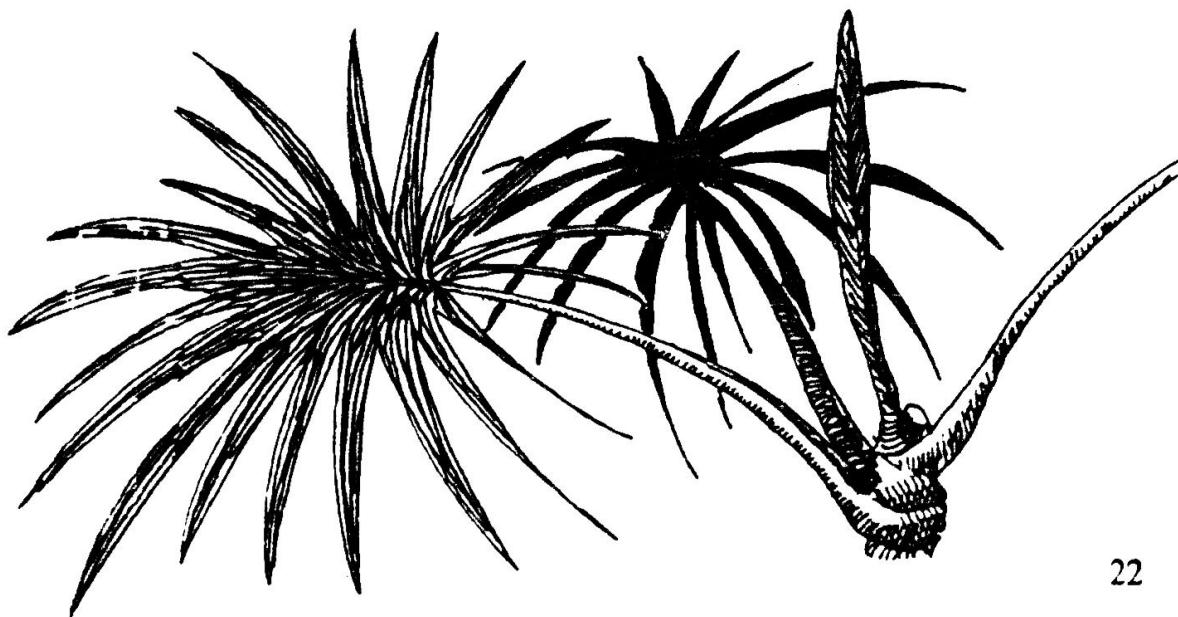


Cupey (*Clusia rosea*) has unique triangular leaves that are extremely thick, light green and fleshy. The leaves may be up to 8 inches long and are arrayed in a spiral around the succulent stem.



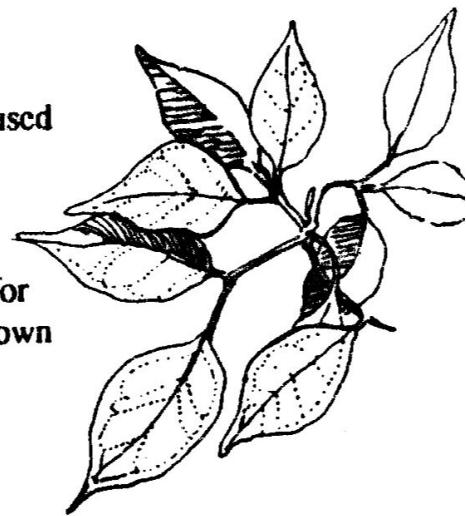
Uvilla (*Coccoloba diversifolia*), like many plants of the genus *Coccoloba*, is easy to recognize. The base of its leaf stem (petiole) wraps like a sheath around the branch. Many coccoloba species inhabit the evergreen forest. *Coccoloba diversifolia*, named for the diverse sizes of its leaves, is very common. The leaves growing near the shady forest floor are up to 15 cm (6") long to capture sunflecks from the canopy; its canopy leaves are only 3 cm (1.5") long, to minimize water loss in the sun. Birds eat its sour fruits.

Fan-leaved palms grow well in cooler valley forests. The useful thatch palm (*Thrinax morrisii*) is fashioned into baskets and brooms.



Ucar and corcho bobo trees may tower above you in the canopy. In the subcanopy, 5 to 10 meters (15 to 30 feet) high, several species of aromatic trees predominate.

**Tea** (*Amyris elemifera*), not to be confused with the hot drink, is in the citrus family. Its crushed leaves, white flowers and smooth, gray bark are pungent like lemon. The highly flammable, resinous wood has often been used for torches. Its teardrop-shaped triads of leaves (shown to the right) are distinctive.



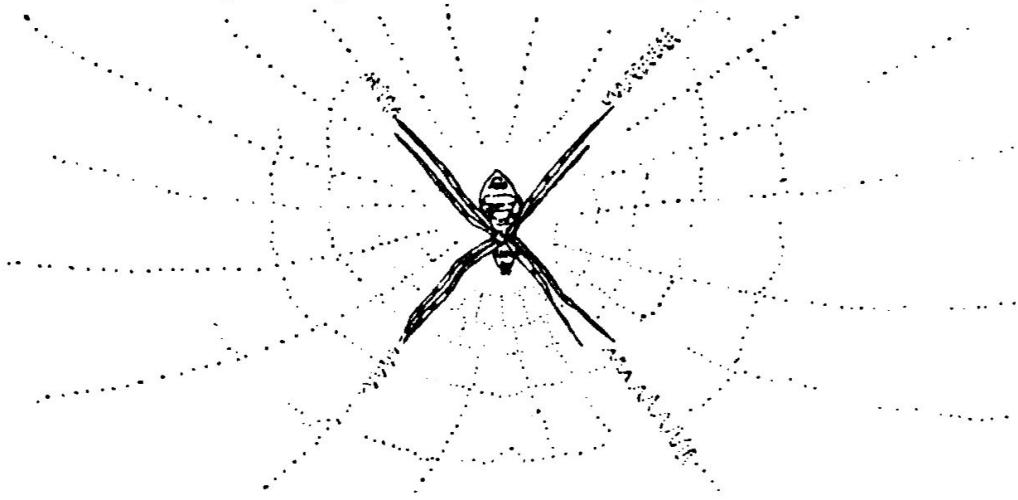
**Hoja menuda** (*Eugenia rhombea*), another aromatic understory inhabitant, has diamond-shaped leathery leaves with black gland dots on the underside and reddish petioles. The smooth gray bark peels off in flakes. The crushed leaves and bark have a spicy, sweet smell.

Large vines and epiphytes proliferate here because there is enough water to pump up their long lanky stems. Strangler figs (*Ficus spp.*) are common.

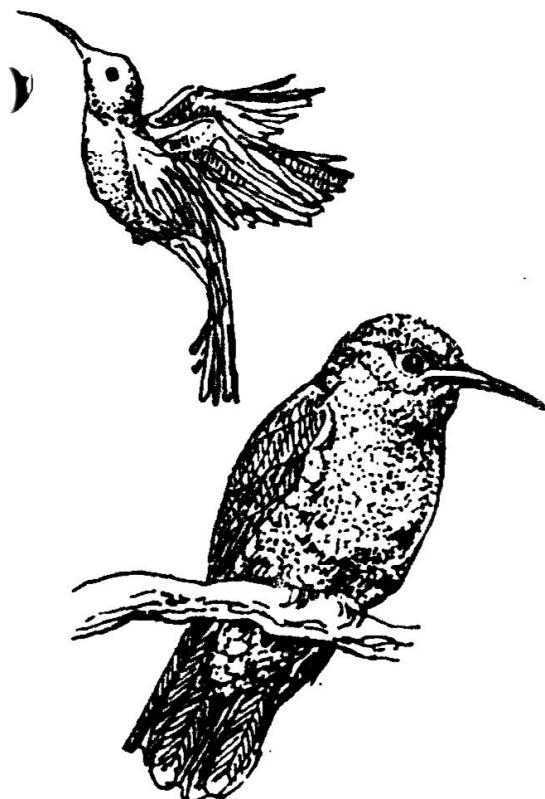
Dropped by birds and bats, the seeds of this strangler fig germinate high in other trees. The growing fig sends thousands of aerial roots down to the ground, which fuse and smother the host tree. Figs in the evergreen forest can be 2 meters across. They produce sweet purple fruits all year that are eaten by bats, birds and ants.



Brilliant yellow, black and red **orb-weaving spiders** sling their webs among the trees to catch insects (and sometimes pedestrians!). Though they are hard to see in the dappled forest understory, a closer look reveals that these spiders sport beautiful colors and patterns on their backs.



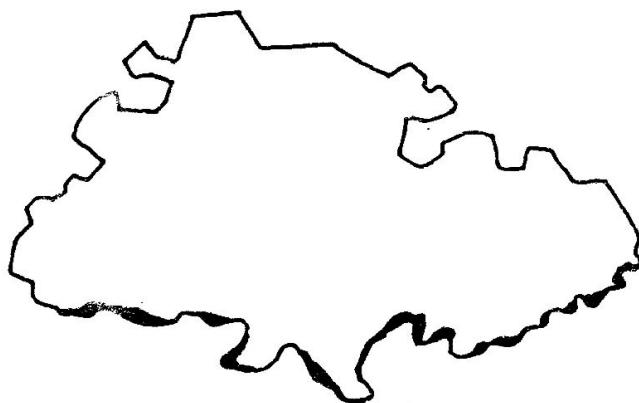
The **pearly-eyed thrasher** (*Margarops fuscatus*) nests in cliffsides and cave ceilings. Its up-and-down whistling call is commonly heard in the ravines. The thrasher often preys on the eggs of other birds.



Listen for the buzz of a hummingbird racing from flower to flower. Large iridescent green **Puerto Rican mangos** (*Anisognathus viridulus*) frequent the evergreen forest, feeding on nectar with their long, curved beaks.

## COASTAL FOREST

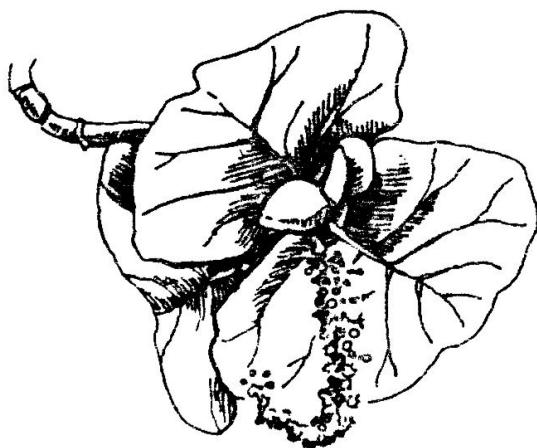
Trees along the coast of Guánica face the toughest struggles of all: in addition to low rainfall, they contend with relentless salty wind off the sea. Their contorted, shrunken growth forms testify to this challenge.



### ■ Where to find coastal forest in the Guánica reserve.

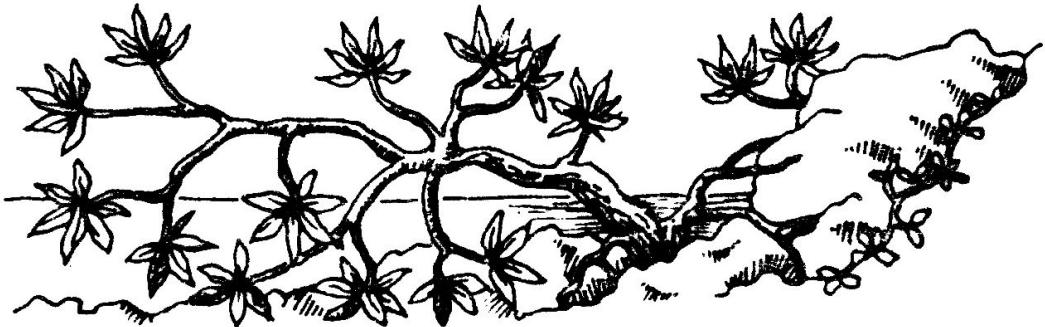
Many plant species respond by toughening up: producing extremely fleshy leaves, succulent stems and deep roots.

This tree-sized milkweed (*Asclepias purpurea*) with giant purple flowers grows along the high tide line of the sandy beaches. Its leaves exude a milky sap that is toxic; yet a bright red milkweed bug, which feeds on the leaves, can ingest the poison without harm. The bug is poisonous to birds, however, and its bright coloration warns them away.



The sea grape (*Coccoloba uvifera*), like the cocolobas of the evergreen forest, has sheathing leaves. The leaves of this species are large, round and leathery, with reddish midveins. Its purple grape-like fruits, produced throughout the year, are edible.

) Other plants hunker down and cling to the seaward cliffs, their roots groping along cracks in the bedrock for a foothold. **Buttonwood mangrove** (*Conocarpus erectus*), named for its round hard fruits, assumes a low creeping form on the headlands, although it can grow to 10 meters high in sheltered swamps and on the cays you see just offshore. These bonsai trees may be very ancient. The **white mangrove** (*Laguncularia racemosa*) has light green fleshy leaves that have a pair of glands at their base. These glands enable the tree to excrete excess salt and conserve precious water.



**Sea blight** (*Batis maritima*) and **sea-side portulacca** (*Sesuvium portulacastrum*), two succulent beach herbs, keep very low to the ground and send runner stems all over the sand, thus helping to reduce beach erosion. The crested toad lays its eggs among the soft stems of these plants.

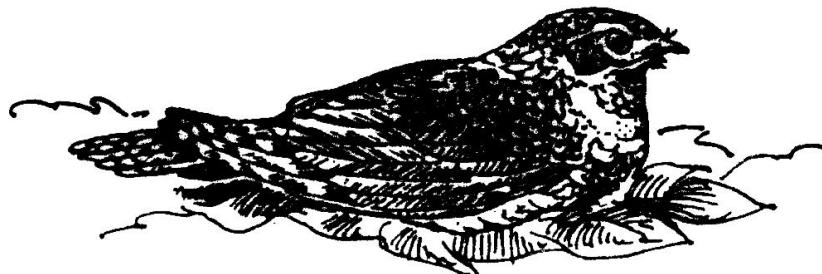


The spectacular coast of Guánica is formed of limestone, the lithified product of coral reefs that are over 100 million years old. Today, new coral reefs form offshore as this coast gradually rises from the sea. You can find remnants of fossil coral colonies in the bedrock and compare these fabulous shapes with the intricate patterns of modern coral rubble washed up on the beach. In exposed places the waves have carved caves and holes, and have pummeled the limestone into fantastic forms. Sheltered coves, on the other hand, have sandy beaches that are critical nesting sites for sea turtles.

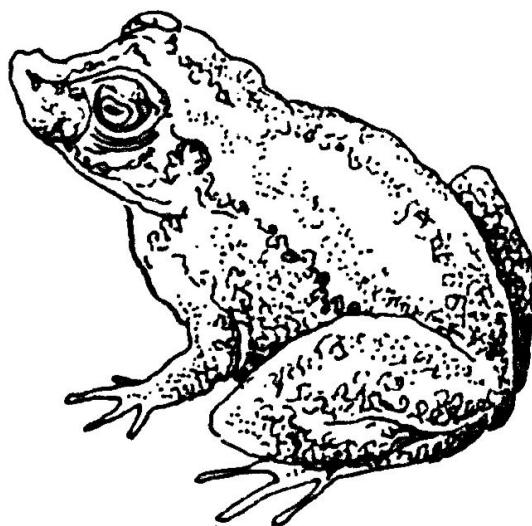
## ENDEMIC AND ENDANGERED

The Guánica Biosphere Reserve has been rightfully called "perhaps the best example of subtropical dry forest vegetation in the world." Only *one per cent* of the dry forest originally covering the planet now remains. The relatively undisturbed Guánica forest, with its mosaic of habitats, is a vital refuge for dry forest organisms that are vulnerable to hunting and degradation of their habitat.

Many species of plants and animals living here are endemic; that is, they are found nowhere else in the world. They have evolved specialized ways to meet the unique demands of this forest. Because their ranges are so limited, they are at risk. For other organisms that are threatened elsewhere in the world, this forest provides a singular safe haven. You may not see these special inhabitants today, because they are so rare.

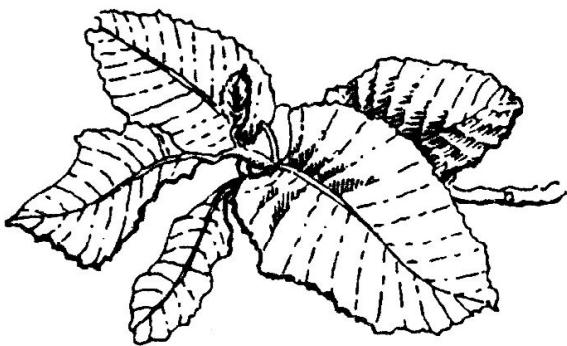
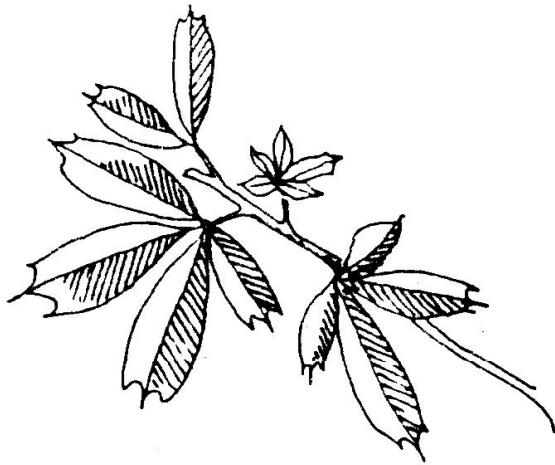


The Puerto Rican nightjar (*Caprimulgus noctitherus*) is all but invisible, because its brown coloration blends in perfectly with the dead leaf litter of the. These birds nest on the ground and stay nearly motionless all day until dusk, when their whistling calls can be heard.



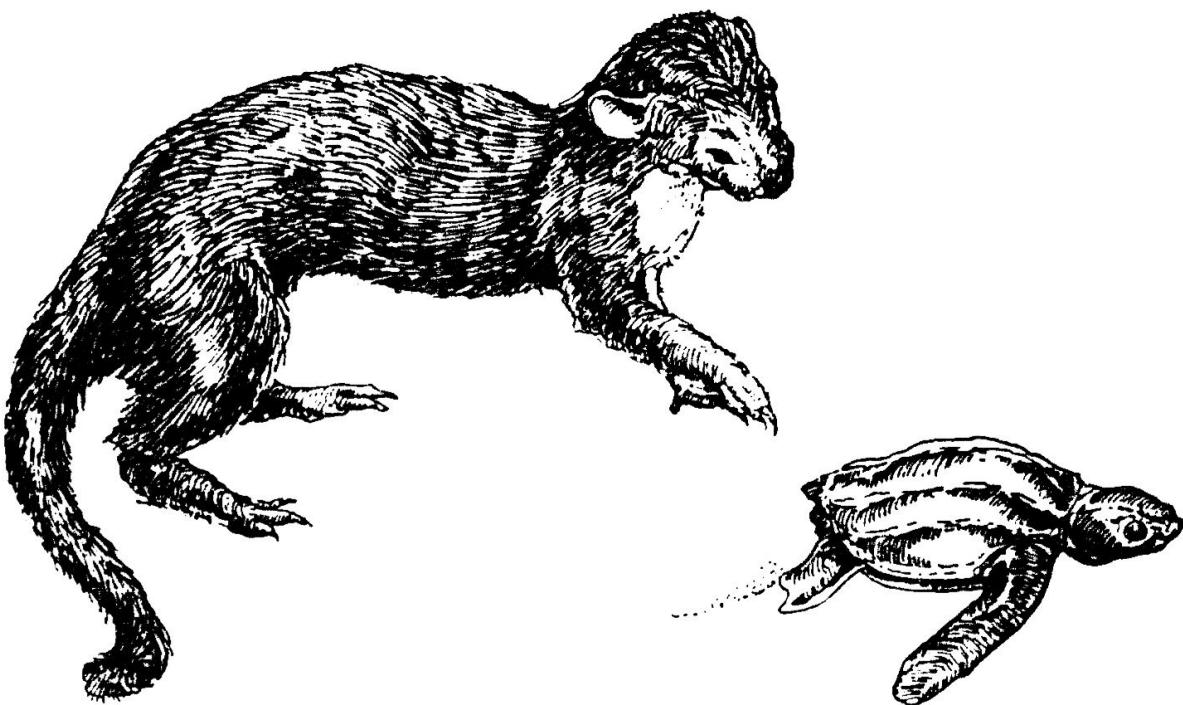
The crested toad (*Bufo lemur*) is born in ephemeral pools that form and vanish with the rains. It spends the long, dry periods in crevices in the limestone and only emerges when it is time to return to the pool to breed.

Though **bariaco** (*Trichilia* *riacantha*) belongs to the mahogany family of plants, this shrub little resembles its cousins. It has clustered spiny leaves on slender brown twigs. Much remains to be learned about its lifestyle and reproduction.

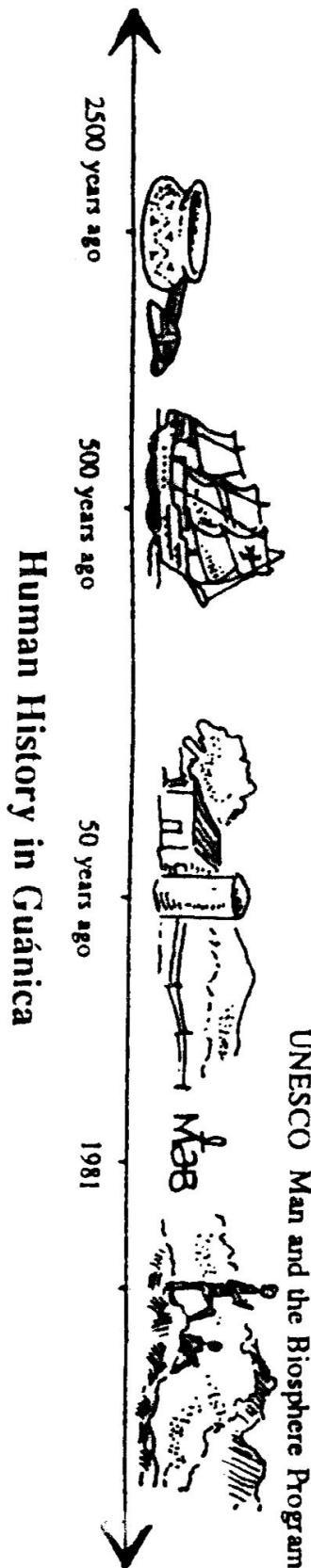


**Serrasuela** (*Thouinia portoricensis*) has characteristic toothed, leathery leaves with obvious veins, rough, scaly gray bark, and hairy green flowers. It is a leggy small tree, often with stump sprouts.

The **green turtle** (*Chelonia mydas*) and **leatherback turtle** (*Dermochelys coriacea*) still use the rocky and sandy beaches of Guánica to lay their eggs. These two turtles have been decimated throughout their ranges. Their meat is a delicacy sought by fishermen. **Mongooses** (*Herpestes javanicus*) prey on their eggs and capture hatchlings that are making their way to the sea.



# HUMANS AND GUANICA



## The First Forest Dwellers

Twenty-five centuries ago the first Taíno Indians moved into the Greater Antilles from the northeast coast of South America. They adapted to island life by becoming adept fishermen as well as farmers and hunter-gatherers, and moved easily among the Caribbean islands in ocean-going canoes that could transport dozens of people. Their society thrived under an elaborate system of political chiefdoms. Five centuries ago the first Spanish Conquistadores, led by Christopher Columbus, landed on the shores of Puerto Rico and fiercely asserted hegemony over the Taíno. The chiefs submitted, but not without struggle. Hundreds of years of slavery, domination and disease all but eradicated the Taíno. Signs of Taíno life and times are rare in Guánica, but fragments of ceramics and petroglyphs carved into cave walls are powerful reminders of their presence here.

## Modern Times

Human societies have long flourished in dry tropical environments from Africa to Australia. The Guánica region has supported farms, villages, cattle pasture and plantations in the last 500 years, as most of southwestern Puerto Rico continues to do. In 1917, Guánica was designated a Commonwealth Forest, and has been protected from cutting and grazing for at least 40 years. Native trees, once threatened by invading species, are seeding in and taking root, and trees once harvested for fencing are re-sprouting. Despite centuries of intensive human use, the Guánica forest fosters the highest diversity of both birds and plants anywhere in Puerto Rico, and the forest continues to recover and grow.

## A Biosphere for the whole world

In 1981, the United Nations recognized the extraordinary ecological value of the Guánica state forest by naming the area a Biosphere Reserve. In the words of UNESCO, a biosphere reserve "conserves examples of characteristic ecosystems...in which people are an integral component...It is a regional centre for monitoring, research and education...where government decision-makers, scientists, managers and local people cooperate in developing a model programme for managing land and water to meet human needs while conserving natural processes and biological resources." Guánica is part of an international network of 285 Biosphere Reserves in 110 countries working to foster sustainable relationships among land and people.



One of several Taino petroglyphs found in the forest.

**THANK YOU FOR YOUR VISIT!**

*If you do not intend to keep this trail guide, please return it to the forest headquarters so that other visitors can use it.*

**For more information,  
stop by the forest headquarters or write:**

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**August 1991**